Open Thesis Topics in Rotorcraft Aeromechanics

Background:

At the Chair of Rotorcraft and Vertical Flight, our research is driven by a fundamental interest in understanding the complex physics of rotor systems. We investigate rotor and wake aerodynamics, aeroelastic blade responses, and the intricate interactions between rotors and airframes. These phenomena govern performance, stability, and efficiency, but are notoriously challenging to predict due to the unsteady, three-dimensional nature of the flows and structural deformations involved. By developing and applying advanced numerical methods and physical models, we aim to capture these effects with high fidelity and provide new insights into the aeromechanics of modern rotorcraft. Students joining our group will engage directly with these core challenges and contribute to research that bridges theory, simulation, and real-world rotorcraft applications.

Possible thesis topics include, but are not limited to:

- Rotor–wake interaction: modeling and analysis of unsteady wake effects and their influence on performance and stability.

- Blade dynamics and aeroelasticity: investigation of fluid–structure coupling and its role in rotor efficiency and vibration.

- Rotor–airframe interaction: studying aerodynamic interference and its impact on flight mechanics and comfort.

- Advanced modeling approaches: development and application of innovative methods to better capture unsteady, three-dimensional rotorcraft aerodynamics.

- Open ideas: students are welcome to propose their own scientifically sound research directions within rotorcraft aeromechanics.

Language: English

How to apply:

Interested? Please send the followings:

- A brief CV
- Transcript of Records
- A one-paragraph statement on your areas of interest (or initial thesis idea)

Start: As soon as possible

Contact:

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Vorticity (1/s) Magnitude